In The News

Interesting Happenings From Around The World

Meet Pi Earth

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Chinese Long March 11 Rocket Launches Satellites to Hunt Gravitational Waves

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Meet "Pi Earth" — a new planet discovered 185 light-years away

What are your feelings on all the new discoveries of 'exoplanets' being discovered with new technology?

Researchers have discovered a new Earth-sized planet. It's orbiting a dim red star some 185 light-years away. The planet's official name is K2-315b. But its nickname is "Pi Earth." The reason: It orbits its star every 3.14 days. That orbit reminded astronomers of the irrational number pi, and the first three digits of pi are 3.14.

Why do you think scientists are so excited about Pi-Earth?

What do they need to figure out next about this planet?

Do you predict in your lifetime we will ever find the ability to reach planets in other galaxies?

Astronomers don't know exactly how warm K2-315b is. That's because they don't know much about its atmosphere or inner workings. Instead, scientists have to imagine how warm the planet would be if it were a simple dark ball heated only by its star. In that case, its surface temperature would be about a toasty 187 degrees Celsius (368 degrees Fahrenheit).

Scientists at MIT and elsewhere have discovered a "pi Earth" — an Earth-sized planet that zips around its star every 3.14 days, in an orbit reminiscent of the universal mathematics constant.

What do you think it would be like to be a scientist or astronomer during this time of discovery?

What do you think it would feel like to discover a planet that might possibly have life on it?

Why are so many scientists around the world confident we will find life on other planets?

Niraula is a planetary scientist who studies exoplanets. He works at the Massachusetts Institute of Technology in Cambridge. He was part of a team that described this new exoplanet on September 21 in The Astronomical Journal. The researchers discovered the new planet while looking through data from NASA's K2 Mission, which ended in October 2018. Explains Niraula, that's "when the spacecraft ran out of fuel."

Would you find the job Niraula has as a planetary scientist something that would interest you?

Why do you think it took almost 3 years after the planet was sighted for Niraula and his team to look closer at the data from NASA's K2 Mission ?

Why was the discovery of this planet more exciting than a lot of the other "Earth-like" planets discovered in the past few years?

Cool Discovery From A Cool Star

"This study presents a new, fairly temperate, [rocky] planet around a low-mass, cool star," says Johanna Teske. She was not involved with the new study, but this astronomer knows what to make of such findings. She studies exoplanets at the Carnegie Institution for Science in Washington, D.C.

Why do you think different agencies such as M.I.T and Carnegie Institution of Science In Washington D.C. work together to learn more information about the unknown—especially space exploration?

How can it be helpful to share data and information with not just people in the United States, but with other countries as well?

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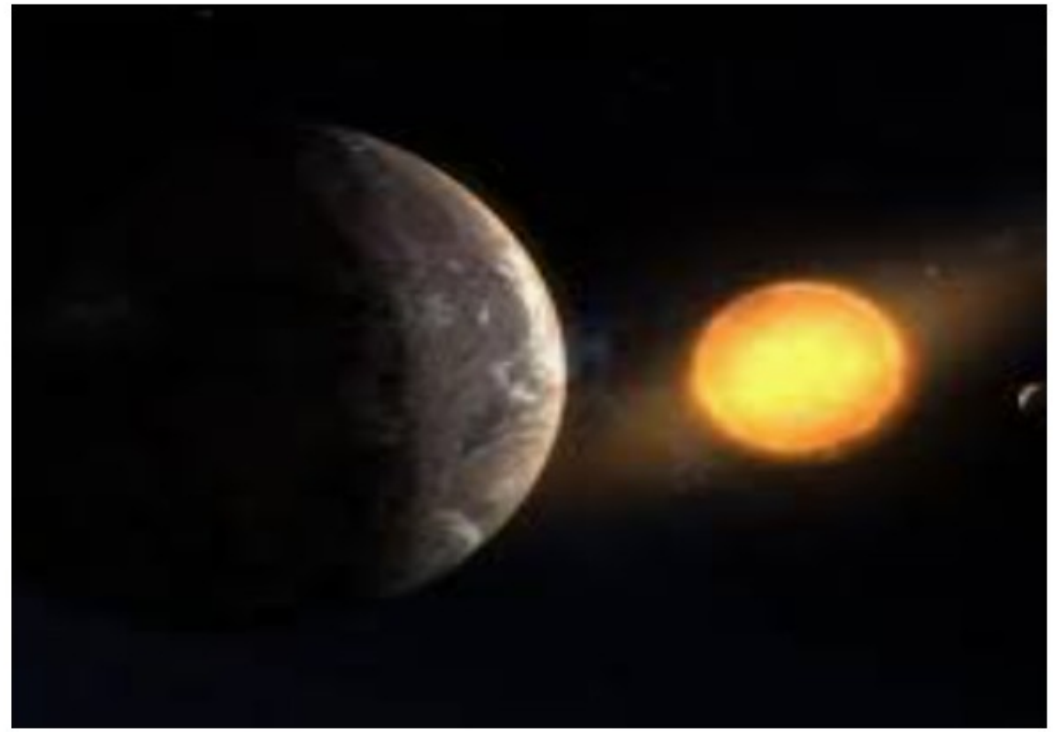
The surface of Pi Earth's star is about 3,000 degrees Celsius (5,500 degrees Fahrenheit). Astronomers call it cool because most stars are much hotter. Detection of Pi Earth was "as part of a survey specifically for planets around these very cool stars," Teske says. "This type of survey is exciting," she says, "because it is really focused on finding the smallest planets." Astronomers couldn't measure how big Pi Earth is directly, Niraula notes, so they measured how big a shadow it cast as it made several passes, in front of its star. His team fed those measurements into a computer model to calculate the planet's size relative to its star.

Why will the temperature and size of the sun or star affect the possibility of life existing on Pi Earth?

What is the major difference that scientists are assuming exist between our planet and Pi Earth?

Why, at this point, is it difficult to know much about this planet?



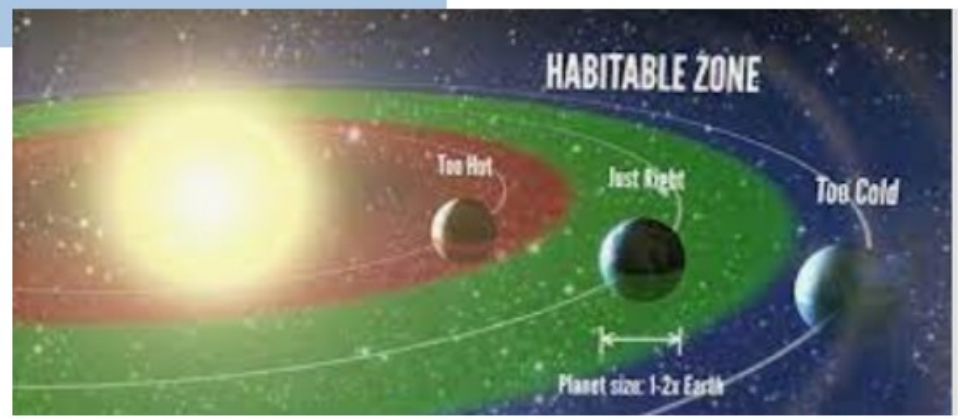
Why is it becoming easier for scientists to spot exoplanets that went unnoticed before?

How has new technology and the use of more powerful telescopes contributed to the advancements of possible life on other planets?

What factors do you think a planet would need to have to host life?

Do you think it is pretentious to assume that all living things on every planet need air and water to survive?
Explain your thoughts.

"Smaller planets are easier to detect around smaller stars," she points out, "because they block out a higher fraction of the star's light." That's how many exoplanets are found. When a planet passes between its star and Earth, the star's light dims. If Pi Earth's home star was as big as our sun, Teske notes, astronomers might never have detected it.



Looking ahead, Niraula wants to study the atmosphere blanketing Pi Earth. He says his team is "excited" to study the chemical recipe of this atmosphere. He describes an atmosphere as "a gateway" to better understanding the makeup of the planet itself.

Why is understanding the atmosphere of any planet going to be an important factor as we move forward in planet exploration?

How can the atmosphere help scientists to understand the make up of the planet itself?

What other projects do you think Niraula has been involved in regarding space exploration?

"Planets around cool stars are one of the best bets for finding 'temperate' planets," Teske says. Those planets are also described as existing in a Goldilocks zone. That means they "are cool enough to have liquid water on the surface," she notes. Many of the planets detected in seemingly habitable zones "are around small stars," she says.

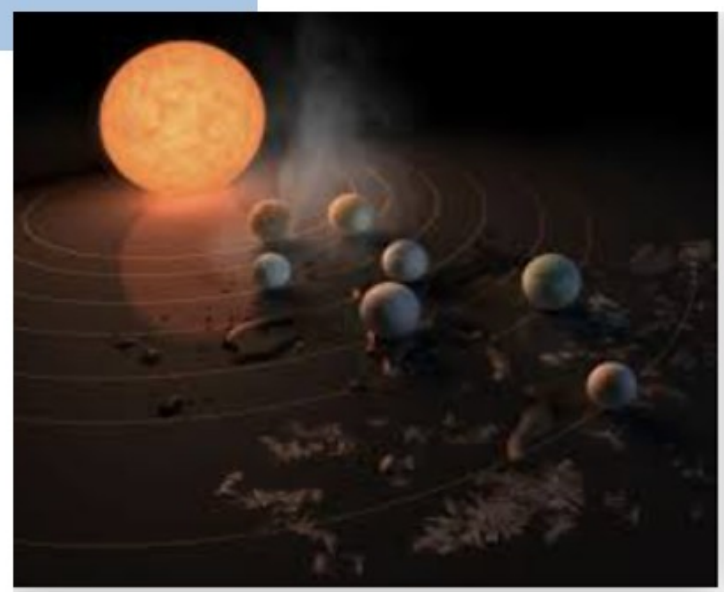
Looking ahead, Niraula wants to study the atmosphere blanketing Pi Earth. He says his team is "excited" to study the chemical recipe of this atmosphere.

Why are planets around cool stars most likely to be the most 'Earth-like"?

What do scientists mean when they refer to some planets as existing in the Goldilocks zone?

What does Niraula mean when he refers to the atmosphere of Pi Earth as a "chemical recipe"?

"Almost all planet-detection papers are the work of a large team," Teske says. "There are lots of ways to get involved in planet detection, including through citizen-science projects like Planet Hunters. Maybe you will also help find a new planet!

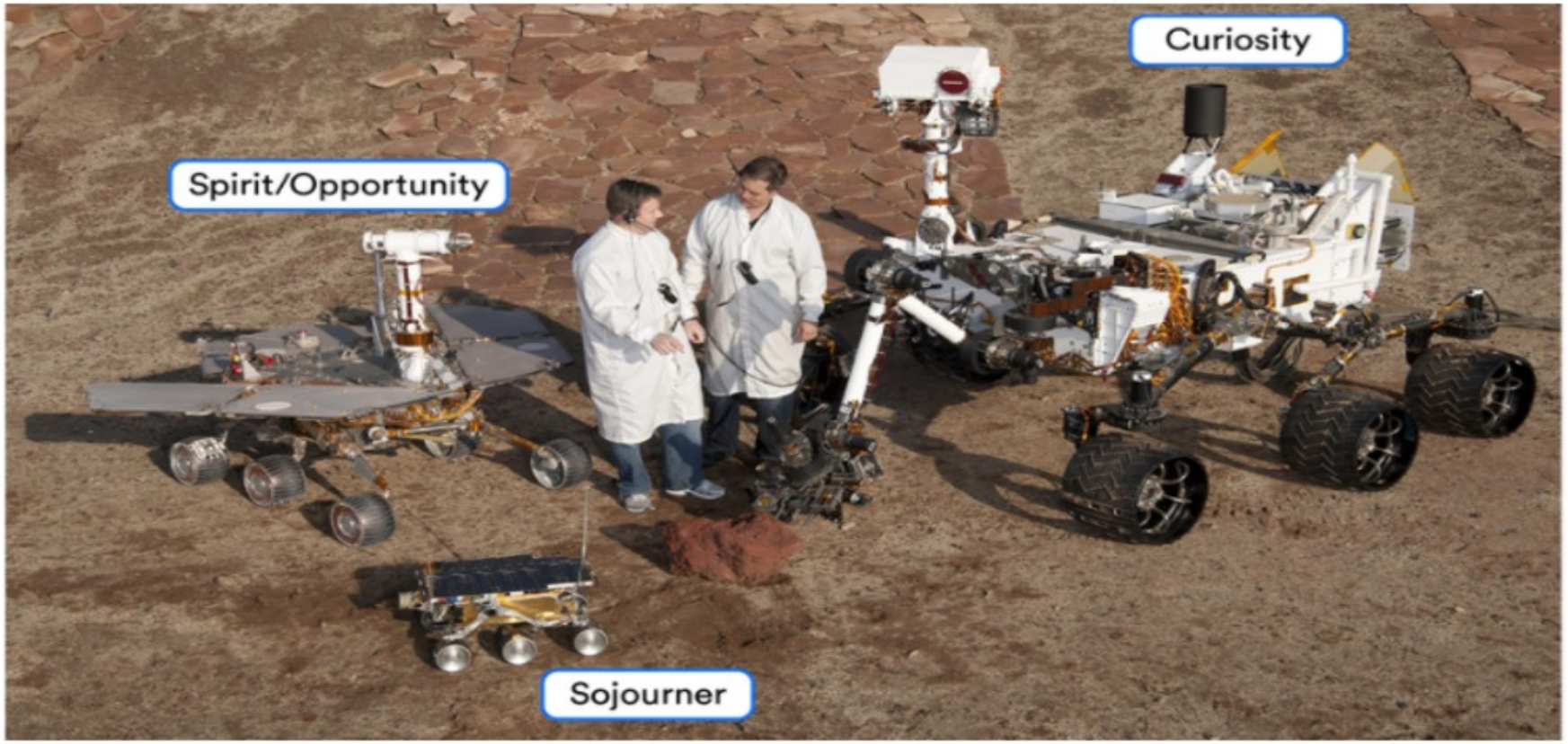


Why do you think that detection of new planets almost always takes a team approach?

What are some ways an ordinary citizen could get involved in searching for new planets?

Is this something you would like to be involved in? Why or why not?

Where Are They Now? Five Rovers On Mars



Two Scientists standing with replicas of Mars rovers at the NASA Jet Propulsion Lab in Pasadena, CA.

By Elena Hartley and Alexa Kurzius, Newsela staff
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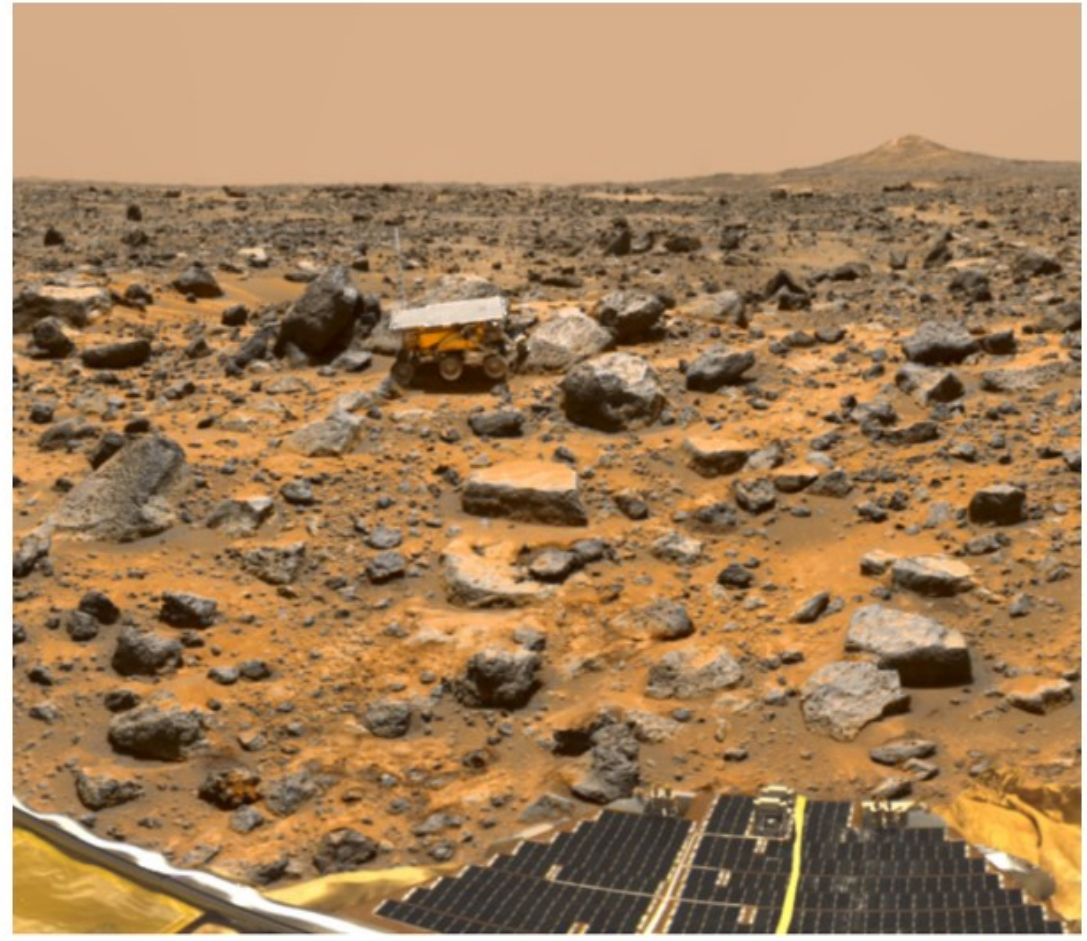
Last month, a new rover named Perseverance landed on Mars. Named by Alexander Mather, a middle school student from Virginia in 2020, the six-wheeled moving robot is part of a NASA mission to learn more about the Red Planet. Mars is called the Red Planet because of its reddish color.
The rover will be looking for signs of microscopic life that could have existed on the planet billions of years ago. But it's not the only robot moving around the planet. In fact, there were four other NASA robots sent to roam Mars, some of which continue to gather data today.



Why do you think there was so much anticipation and excitement when Perseverance landed on Mars last month?

What do NASA scientists hope to find this time around from pictures and images of Mars?

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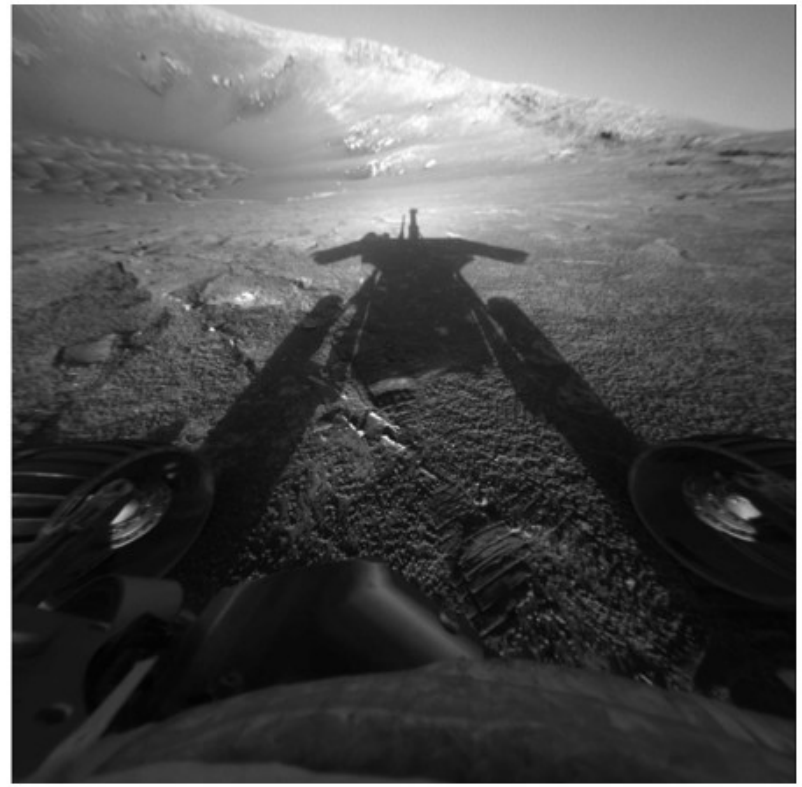
Sojourner was NASA's first wheeled vehicle to arrive on Mars, doing so on July 4, 1997. The rover spent 83 days exploring the surface of Mars, taking photos and measurements of the atmosphere and chemicals on the planet before losing communication with Earth.

Spirit And Opportunity
The next rovers to land on Mars were Spirit and Opportunity. Spirit arrived on Mars on January 4, in 2004. Opportunity arrived on January 25, 2004. They searched for rocks on Mars that could tell scientists on Earth where there was ever water on the red planet.

Why have each of the robots launched by the U.S. to Mars been important in its own way?

Why has the launching of each robot had different missions and goals once the reached Mars?

Why is the data they gather even now valuable to the scientists at NASA?



NASA's Opportunity rover took a photo of its own shadow during its mission.

The rovers carried identical sets of scientific instruments, though they went to opposite sides of the planet.
Together, Spirit and Opportunity contributed to scientific knowledge about the planet. The rovers found evidence of water and volcanic activity. They also took hundreds of thousands of photos, some of them in color.

How have all the previous robots that NASA has sent to Mars helped in learning more about the planet?

What benefits can the world gain from the information these robots have gathered and sent back to Earth?

Curiosity

Curiosity's high-tech camera allows it to capture detailed photos to send back to scientists on Earth. It's even taken a selfie of itself.

Do you think we can successfully build a colony to live on Mars and if so, would you want to live there? Why or why not?

The Curiosity rover landed on Mars on August 6, 2012. It went to investigate the planet's climate and geology and whether Mars could have supported life in the distant past. The rover is still operating as of the date of this article's publication, gathering data and rock samples using its high-tech scientific instruments.
Some of Curiosity's biggest findings so far include finding evidence of liquid water in the distant past.

With Curiosity's findings of liquid water in the distance past, how did that influence how Perseverance was designed and what this robot's goal would be?

Perseverance

Perseverance takes a test drive at NASA's Jet Propulsion Laboratory in California.

Perseverance, the newest rover to land on Mars, arrived on February 18, 2021. Its main goal is to search for signs of ancient life in a crater where it landed.
It will take photos with its 19 cameras and record sounds of Mars for the first time using a microphone as well as take samples of the surface of Mars and put them into containers that can be returned to Earth by a future mission.

Knowing how many billions of dollars it took to build Perseverance, do you think the money that has been invested in space exploration of Mars was wisely spent? Explain your point on this matter.

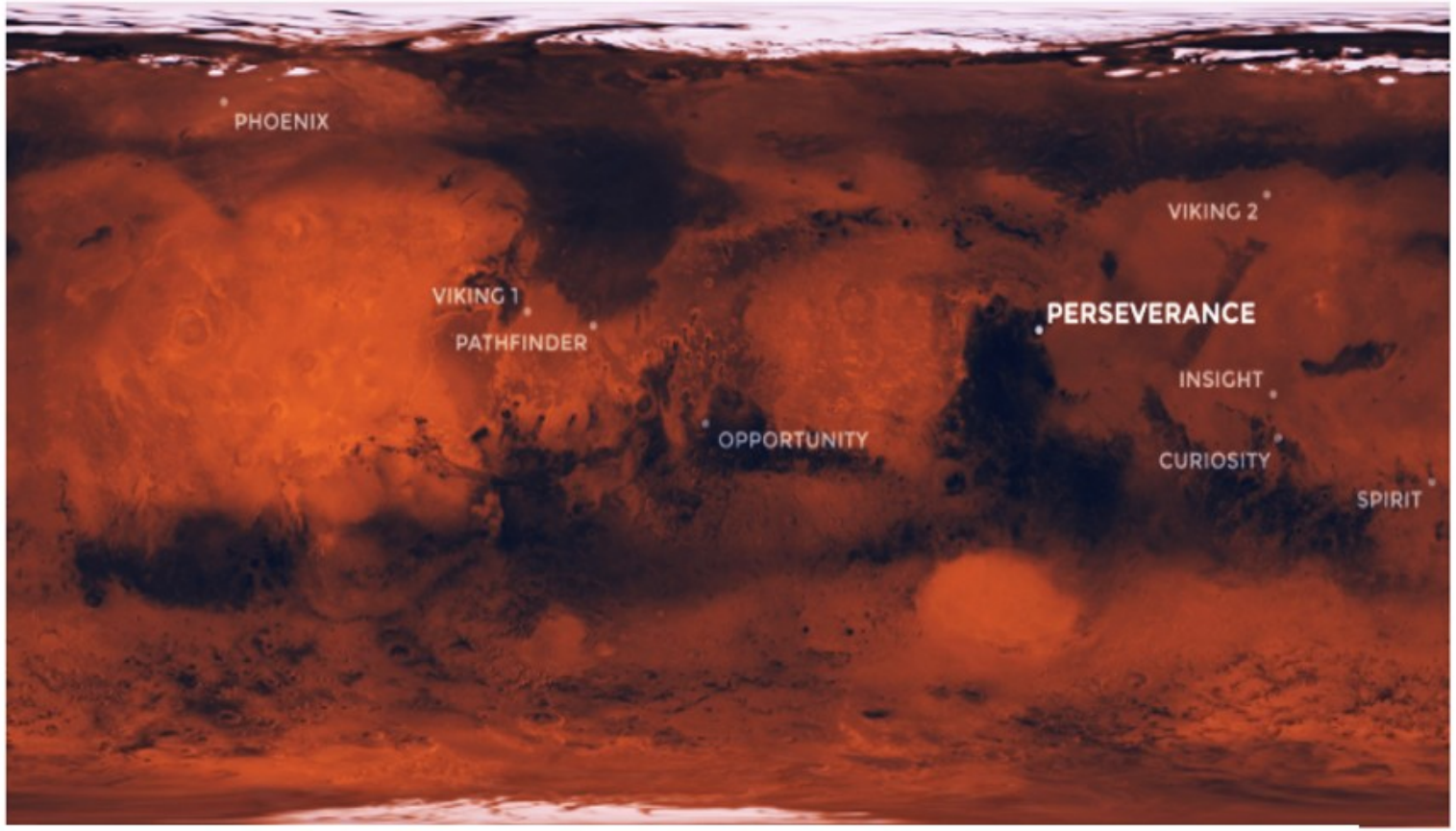
An artist's concept of the Ingenuity helicopter on the surface of Mars with the Perseverance rover in the background.

On its mission, Perseverance has a very important passenger: a 1.8 kilograms (4 pounds) helicopter named Ingenuity that rides on its belly. The helicopter is part of a test to determine whether aircraft can fly on the red planet, which has an atmosphere that is 99 percent less dense than on Earth.

How will the helicopter that accompanied Perseverance to Mars help for future journeys?

What do you think would happen if scientists actually do discover that there once was life on Mars?

Where Are They Now?



This 20 map shows where NASA's Mars rovers and landers are today.

This map shows where NASA's rovers and landers are. Landers on the map include Viking 1 and 2, which arrived on Mars on July 20 and September 3, 1976, respectively. Also included are Pathfinder which landed on July 4, 1997; Phoenix, which landed on May 25, 2008; and InSight, which landed on November 26, 2018.
Together, these missions reflect a massive scientific achievement to learn more about the red planet and pave the way for future robotic and human exploration.

Do you think that it would be better to continue with robotic exploration of Mars, or would it be better to send actual astronauts and explorers instead? Explain your point of view.

Chines Long March 11 Rocket Launches Satellites To Hunt Gravitational Waves

What do you think the discovery of gravitational waves will help scientists learn about space?

Why is China the first country to launch a satellite to measure these waves?

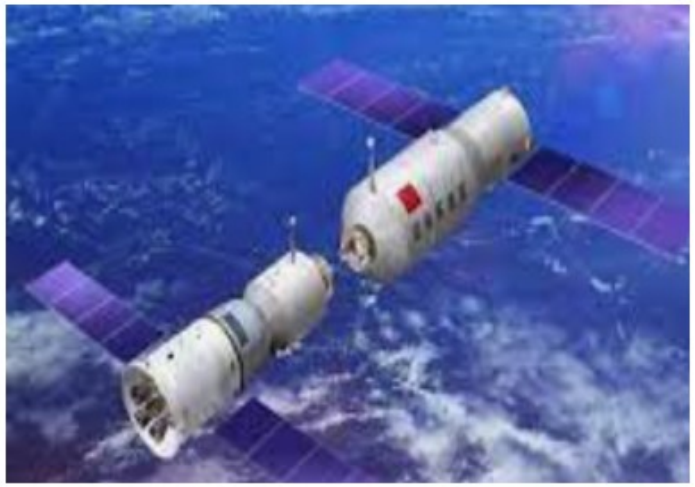
The Gravitational Wave High-energy Electromagnetic Counterpart All-sky Monitor (GECAM) mission launched at 3:14 p.m. EST on Dec. 9 (2014 GMT Wednesday or 4:14 a.m. local time Thursday, Dec. 10) from the Xichang Satellite Launch Center in the southwestern Sichuan province.

"The launch of these scientific satellites will enable our country to make important breakthroughs in exploring the extreme universe, solar activities and the relationship between the sun and the Earth," Wang Chi, head of the Chinese Academy of Sciences' National Space Science Center.

China has successfully launched a pair of satellites into space to learn more about gravitational waves or echoes in space time from huge mergers or cosmic events.

What do you think China hopes to learn about gravitational waves or echoes in space?

What value do you suppose this information will have in the further exploration of space?

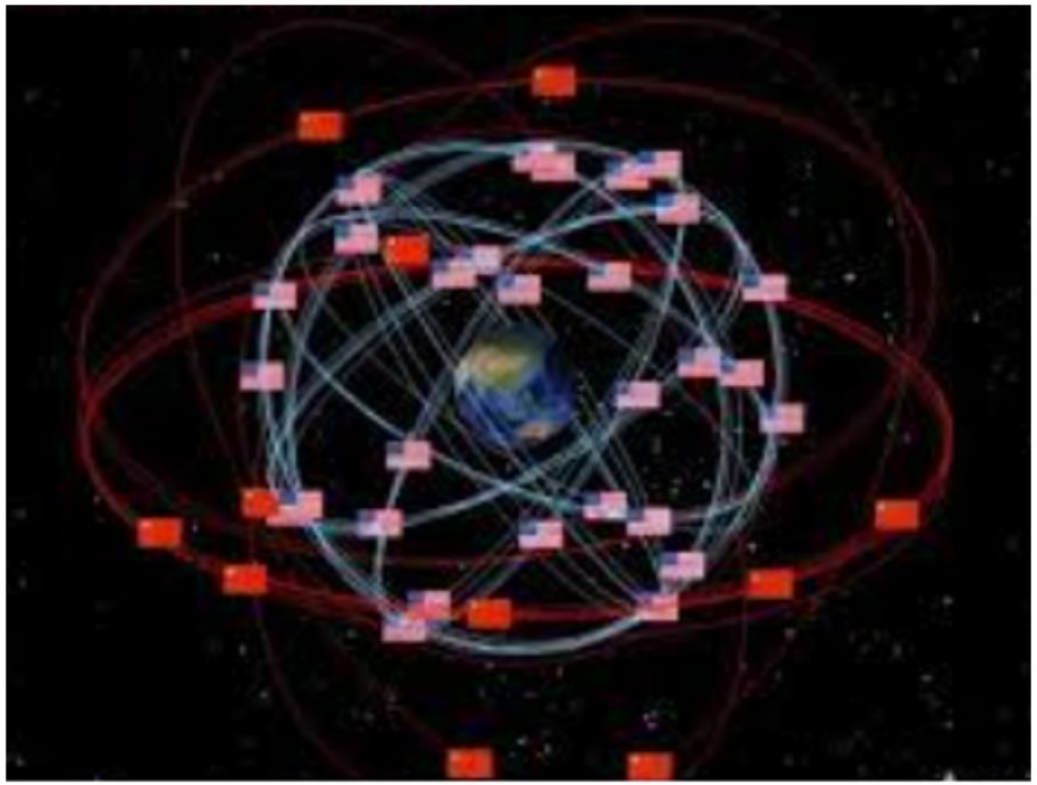


The Chinese satellites have an advantage over existing observatories searching for gamma rays, or bursts of energy from these collisions, because their view is not obscured.

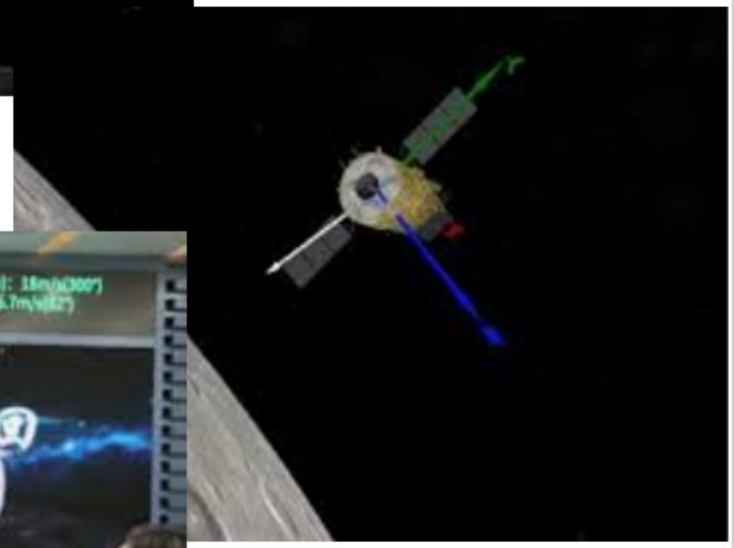
What advantage do Chinese satellites have over existing one already in orbit?

Why do you think other countries have obscured views of what China is observing?

How do you think understanding how gamma rays and bursts of energy collide can help in our greater knowledge of space itself?



China also successfully docked the ascent module of its Chang'e-5 moon-landing spacecraft with an orbiter spacecraft, as part of larger mission to return samples from the lunar surface. The moon mission was performed by the China National Space Administration, while the new gravitational waves mission is under the science-focused National Space Science Center.



Why do you think any kind of advancements for a country can help its self-esteem and pride?

Why is it important for other countries to acknowledge and congratulate each other for advancements that will benefit and help world knowledge?

How do you think China's advancements in its new space venture in measuring gravitational waves will benefit other understanding of space?